

and looser less strongly pedunculate spikes, longer-pedicelled pods, which are longer, narrower and more acuminate, with longer and more or less persistent instead of early deciduous styles, and with the pubescence coarsely appressed-hairy instead of thinly tomentulose.

It would appear that so well distinguished a plant, if not a rare species, would have been often collected unless by reason of its very brief flowering period it has escaped notice when in flower and at other times has been passed over for some common *Meibomia* which in appearance it strongly suggests.

NOTES ON LIRIODENDRON LEAVES

BY EDWARD W. BERRY

(WITH PLATES I AND 2)

The accompanying plates represent leaves borne near flowering buds, either foliar flower-bud-scales or the next older leaf than the bud-scale on full grown trees. Those figured on plate 1 are one-fourth natural size, and those on plate 2 are two-thirds natural size. They all serve to confirm the view previously affirmed* that the diversion of sap for other purposes causes the abbreviated Liriophyllum-like leaf-form in this genus (*i. e.*, *Liriodendron*). The broadly-winged stipular appendages of the leaf-stalk are much commoner this year (1901) than I have ever before observed them and it is quite possible that this excessive stipular development may be a correlative of the long continuous wet weather which was such a remarkable feature of the past spring. Further support of this view is furnished by the ordinary stipules which seem to average much larger in size than usual.

In some of the specimens the stipules are merely adnate, and doubtless would, in a less wet season, become entirely separated, splitting away from the petiole when it straightened, as do the winged petiolar appendages in some species of *Magnolia*. Other of the specimens however show evidence of a true persistent union between petiole and stipule.

Of Figs. 3, 6, 7, 8, 11, and 12, the only one that need be especially mentioned is the leaf shown in Figs. 6 and 7. Fig. 6 shows the entire leaf with its winged petiole, and Fig. 7 the en-

* Bull. Torr. Club, 28. S. 1901.

larged detail, to which attention is especially directed, together with a cross section of the petiole showing the fibrous margin formed by the descending lowest primary vein. The lowermost vein divides as it approaches the midrib, the upper branch joining the latter, while the lower branch is directed downward and passes along the side of the petiole, remaining distinct as a tiny fibrous margin of the latter all the way to the point of insertion of the stipular wings.

Figs. 1, 2, and 4 show specimens in which the leaf-blade has only developed sufficiently to form very small, ovate leaves which, both in shape and venation, are very similar to *Liriodendron* cotyledons, or to what I consider the ancestral type of *Liriodendron* leaf to have been. Their summits are crowned with a longer or shorter length of the persistent awn-like tip of the midrib (in Fig. 1 the latter is 5 mm. in length).

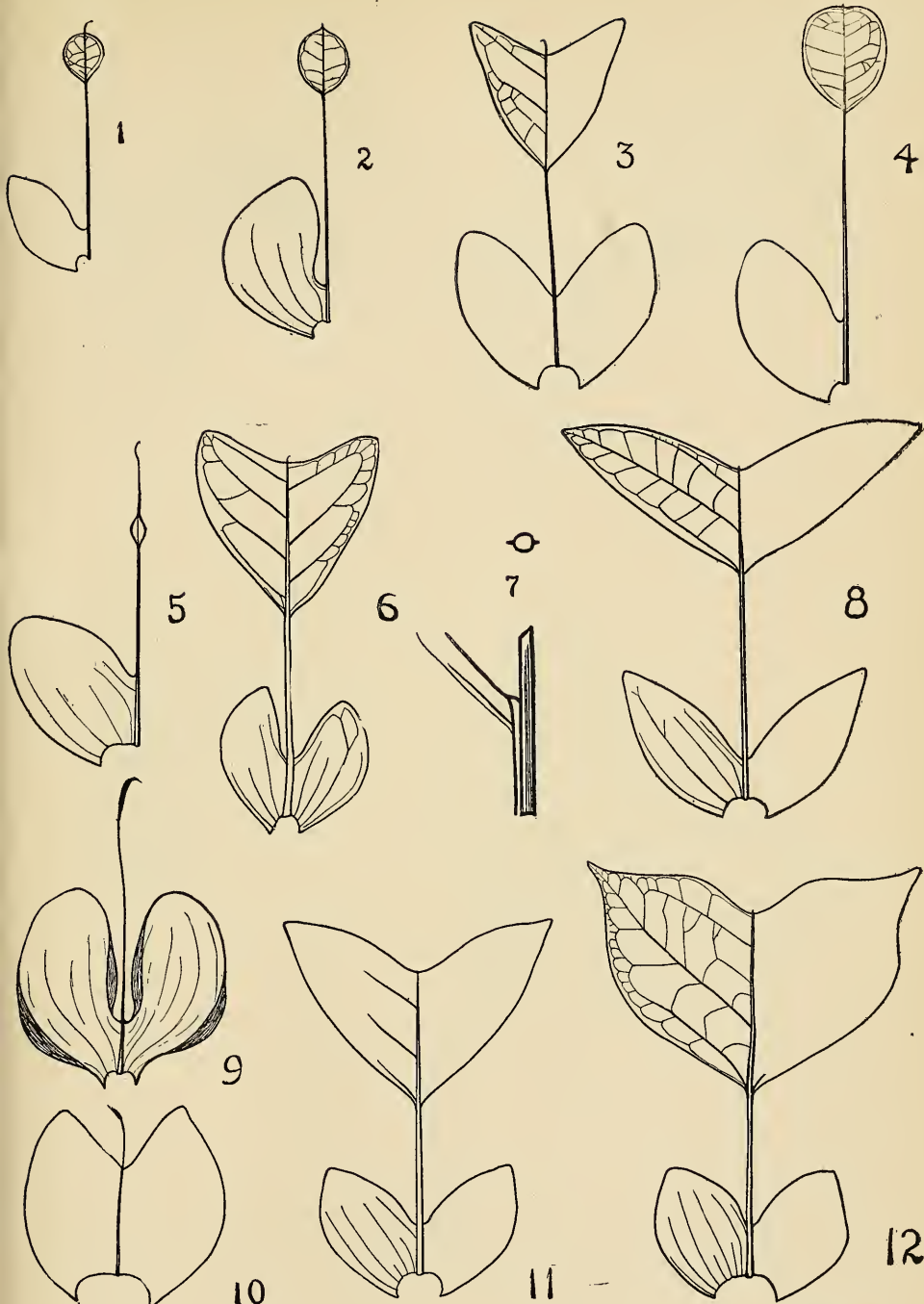
Figs. 5, 9, and 10 show what I considered after careful comparison and measurement to be anomalous flower bud-scales, before I found them in position on the tree. Afterward I found numerous specimens in position (Figs. 13 to 16).

The forms figured at 10, which are quite common, have the midrib developed for a considerable distance as a thread-like, fibrous bundle with no trace of green tissue. In those forms figured at 9, of which I have numerous specimens, the midrib is much more extensively developed, being the normal length of a true midrib, and bearing at its summit a thickened cylinder of green tissue, evidently an abortive leaf-blade.

In Fig. 5, this mass is expanded into a true leaf-blade, ovate-lanceolate in shape, and of tiny dimensions, bearing at its summit the extended midrib as an awn of 21.5 mm. in length.

Fig. 10 minus the extended midrib shows the ordinary form of the flower bud-scales which may be found in great numbers rolled up on the ground beneath the trees as soon as the buds have swollen sufficiently to cast them off.

Figs. 5, 9, 10, 13, 14, 15, and 16 are especially interesting inasmuch as they are practically identical with the foliate bud-scales referred to in a previous paper (*l. c.*) as occurring in the related genus *Magnolia*.



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LIRIODENDRON LEAVES

¼ nat. size.